

CLAIMS

1. A drive apparatus for an injection molding machine characterized by comprising:

(a) a driven portion;

(b) a transmission shaft having a screw shaft portion and an output shaft portion and which is connected to the driven portion so as to be rotatable with respect thereto and which is able to advance and retract;

(c) a nut which is threadingly engaged with the screw shaft portion;

(d) a motor frame which is mounted on a motor mounting frame;

(e) a rotor which is mounted on the output shaft portion; and

(f) a stator which is mounted on the motor frame.

2. A drive apparatus for an injection molding machine as set forth in claim 1, wherein the rotor is a permanent magnet.

3. A drive apparatus for an injection molding machine as set forth in claim 1, wherein one of the axial length of the stator core and the axial length of the rotor is longer than the other by at least the stroke of the transmission shaft.

4. A drive apparatus for an injection molding machine as set forth in claim 1, wherein the nut is secured to one of the motor frame and the motor mounting frame.

5. A drive apparatus for an injection molding machine as set forth in claim 1, wherein a position sensing portion is disposed between the output shaft portion and the motor frame.

6. A drive apparatus for an injection molding machine as set forth in claim 1, wherein the periphery of a stator coil of the stator is filled with a resin.

7. A drive apparatus for an injection molding machine as set forth in any one of claims 1 - 6, wherein

- (a) the driven portion is a screw;
- (b) the motor frame is a motor frame for injection; and
- (c) the screw and the transmission shaft are connected through a bearing box.

8. A drive apparatus for an injection molding machine as set forth in claims 7, wherein

- (a) the bearing box is disposed inside a hollow output shaft of a metering motor; and
- (b) rotation of the output shaft is transmitted to the bearing box through a rotation transmitting portion.

9. A drive apparatus for an injection molding machine as set forth in any one of claims 1 - 6, wherein

(a) the driven portion is a crosshead of a toggle mechanism; and

(b) the motor frame is a motor frame for mold clamping.

10. A drive apparatus for an injection molding machine as set forth in any one of claims 1 - 6, wherein

(a) the driven portion is a movable platen; and

(b) the motor frame is a motor frame for mold clamping.

11. A molding method using an injection molding machine comprising a driven portion and a drive portion equipped with a transmission shaft having a screw shaft portion and an output shaft portion and connected to the driven portion so as to be able to rotate with respect thereto and which is able to advance and retract, a nut threadingly engaged with the screw shaft portion, a motor frame mounted on a motor mounting frame, a stator mounted on the motor frame, and a rotor mounted on the output shaft portion, characterized by:

(a) advancing and retracting the rotor by driving the drive portion and rotating the rotor; and

(b) advancing and retracting the driven portion by advancing and retracting the transmission shaft.

12. A molding method as set forth in claim 11, wherein one of the axial length of the stator core and the axial

length of the rotor is longer than the other by at least the stroke of the transmission shaft.

13. A molding method as set forth in claim 11, wherein the position of the driven portion is sensed between the output shaft portion and the motor frame.